

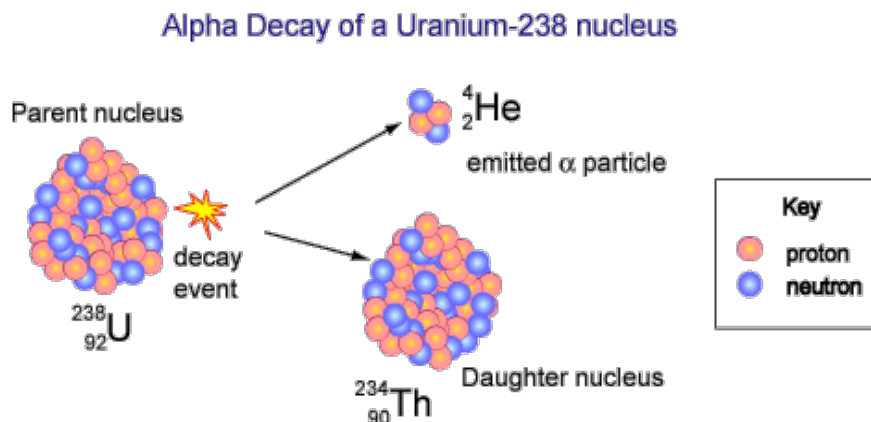
## AP Chemistry Review Session #1

### Atomic Structure and Nuclear Chemistry

Nuclear reactions take place by changes in the nucleus of the atom.

Types of radioactive particles:

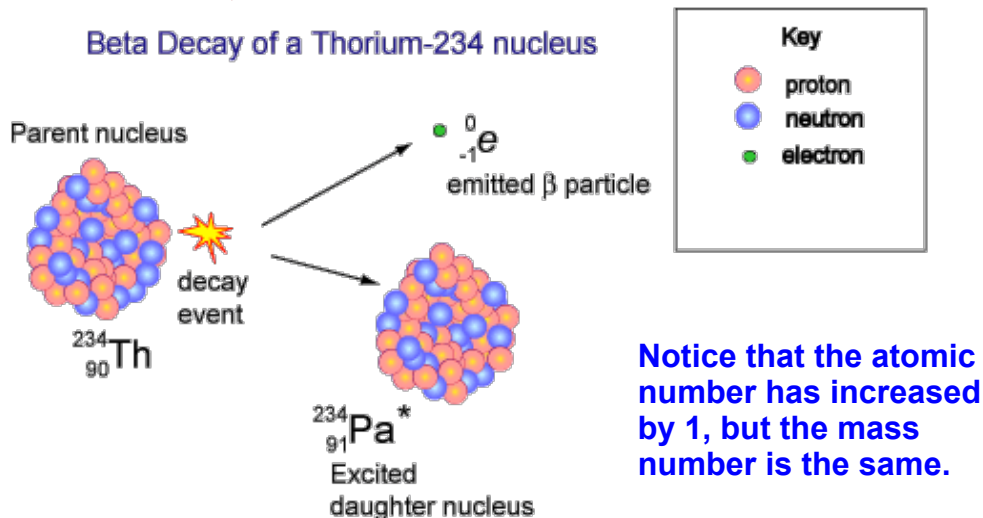
Alpha ( $\alpha$ ) particles:  ${}^4_2\text{He}$



Types of radioactive particles:

Beta ( $\beta^-$ ) particles:  ${}^0_{-1}\text{e}$

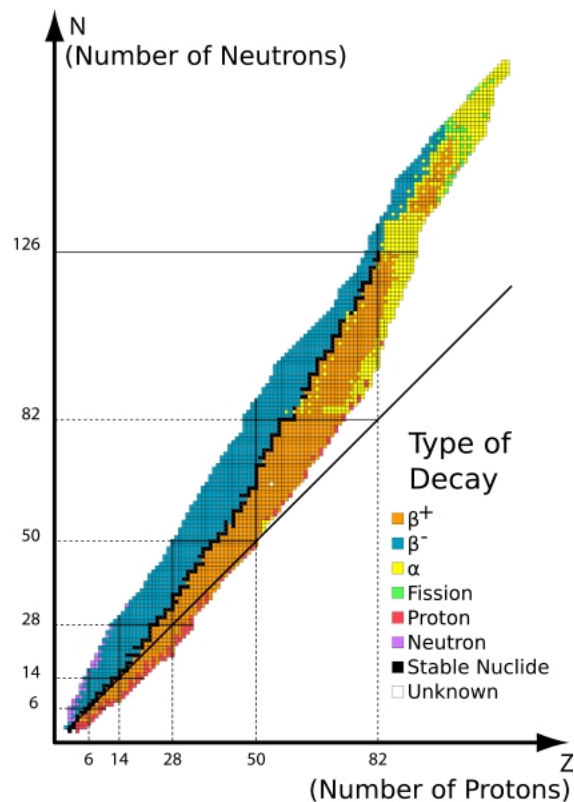
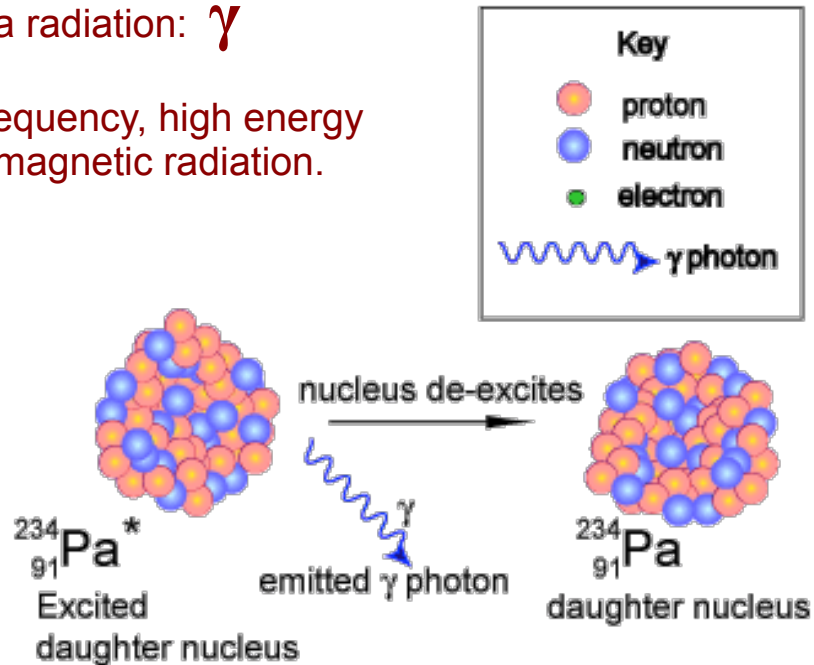
A neutron breaks apart into a proton (stays in the nucleus) and an electron, which is emitted.



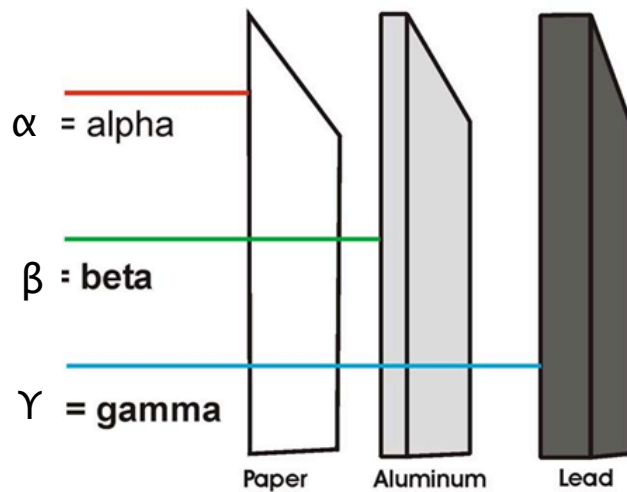
## Types of radioactive particles:

Gamma radiation:  $\gamma$

High frequency, high energy electromagnetic radiation.



# Penetrating Power

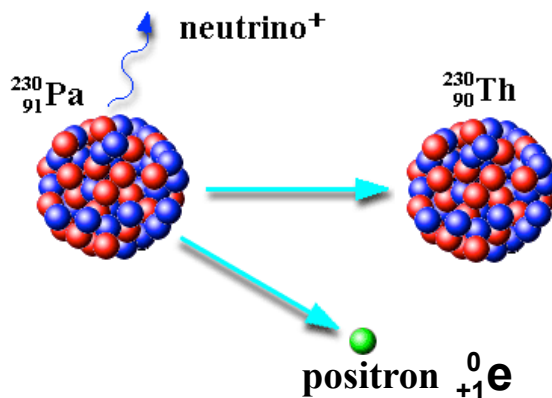


Penetration Power of Radiation

## Types of radioactive particles:

Positron ( $\beta^+$ ) emission:  ${}^0_{+1}\text{e}$

- A positron is an anti-electron.
- When a proton decays into a neutron, a positron is emitted.

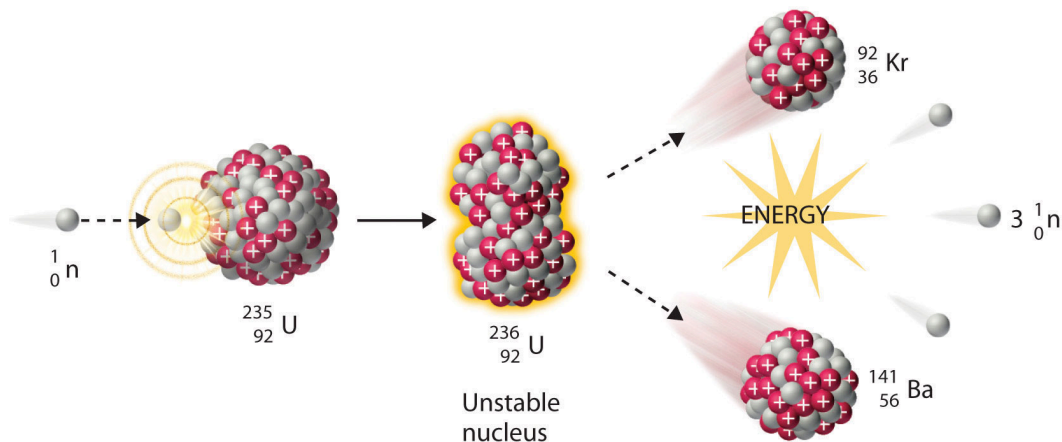


Notice that the atomic number is 1 less, but the mass number is the same.

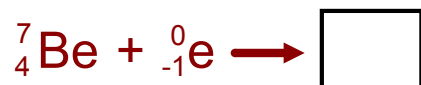
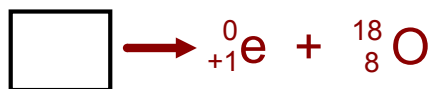
## Types of radioactive particles:

Neutrons:  ${}^1_0\text{n}$

- Nuclei with extra neutrons are usually unstable, leading to nuclear fission.



## Nuclear reactions:



**Half Life** - time it takes for half of a sample of radioactive isotope to decay.

Example:

100. g of a radioactive isotope has a half life of 2.00 years.  
How much of the sample will remain in 10.0 years?